Chapter -6
TECHNICAL REPORT

6.1 General

The project had the following technical and scientific objectives:

- To provide better performing, innovative pavement maintenance techniques and procedures that will reduce traffic disruption at the road works, in terms of congestion and improved safety;
- To develop an integrated cost-benefit analysis model that addresses key aspects of pavement maintenance, including road user costs;
- To produce safety strategies for road works that allow for arranging the work site lay-out and the timing of maintenance intervention in such a way that the safety of road users and road workers are optimised;
- To propose methods, procedures and equipment for monitoring the condition of road pavements at traffic speeds to minimise the number of disruptive road closures currently required for acquiring pavement condition data.

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RIGID PAVEMENT DESIGN

RIGID PAVEMENT DESIGN:

A) The rigid pavement consists of cast in-situ/ premix concrete.

The slab design method is based on assessments of the:

- Predicted traffic volume and composition over the design period
- Strength of the subgrade in terms of its California Bearing Ratio
- Strength of the base concrete
- As the roads taken for development are slushy and having low CBR value, a layer of GSB is provided as Sub Base Course.

B) A bound of lean mix concrete sub-base is recommended under a concrete pavement for one or more of the following reasons:

- To resist erosion of the sub-base and limit 'pumping" at joints and slab edges.
- To provide uniform support under the pavement
- To reduce deflection at joints and enhance load transfer across joints (especially if no other load transfer devices are provided, such as dowels); and
- To assist in the control of shrinkage and swelling of high-volume-change subgrade soils

Table 3.1 Approximate k Value Corresponding to CBR Values

Soaked subgrade CBR	2	3	4	5	7	10	15	20	50
k Value (MPa/m)	21	28	35	42	48	50	62	69	140

Table 3.2 Effective k Values Over Granular and Cementitious Subbases

Soaked CBR	2	3	4	5	7	10	15	20	50
k Value over granular subbase (thickness 150 to 250 mm). MPa/m	25	34	42	50	58	60	74	83	170
k Value over 150 to 200 mm cementations sub base MPa/m	42	56	70	84	96	100	124	138	280

The composition of pavement layers from the above Detailed Design is shown in table below.

Pavement compositions

Recommended Layers, mm		
PQC	Base Course	Sub Base Course
150	150	150

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FLEXIBLE PAVEMENT OVERLAY DESIGN

DESIGN TRAFFIC:

The following equation is used to compute the design traffic in terms of the cumulative number of standard axles.

$$Ns = \frac{365 \times ((1+r)^{n} - 1)}{R} \times A \times D \times F$$

Where,

Ns = Cumulative number of standard axles to be catered for in the design, MSA.

A = Initial Traffic

r = Annual growth rate of commercial vehicles

n = Design life in years

F = Vehicle Damage Factor

D= Lane distribution factor

The design traffic computed in terms of cumulative number of standard axles (msa).

City roads should be designed for minimum 2 msa traffic. (As per IRC 37 – 2012, Page No. 25, Plate 5)

The composition of pavement layers from the above Detailed Design is shown in table below. For profile correction DBM is provided and WMM in bad stretches.

Pavement compositions

Recommended for Surface course of 2 MSA		Recommended Base course of 2 MSA	
BC	**DBM**	**WMM**	**GSB**
40	50	Cut Potion	Cut Potion

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FLEXIBLE PAVEMENT DESIGN

DESIGN TRAFFIC:

The following equation is used to compute the design traffic in terms of the cumulative number of standard axles.

$$Ns = \frac{365 \times ((1+r)^{n} - 1)}{R} \times A \times D \times F$$

Where,

Ns = Cumulative number of standard axles to be catered for in the design, MSA.

A = Initial Traffic

r = Annual growth rate of commercial vehicles

n = Design life in years

F = Vehicle Damage Factor

D= Lane distribution factor

The design traffic computed in terms of cumulative number of standard axles (msa).

City roads should be designed for minimum 2 msa traffic. The CBR of soil is 7% CBR (As per IRC 37 – 2012, Page No. 25, Plate 5).The composition of pavement layers from the above Detailed Design is shown in table below.

Pavement compositions

Recommended for Surface course of 2 MSA		Recommended Base course of 2 MSA	
BC	**DBM**	**WMM**	**GSB**
40	50	230	150

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